INSTRUCTION MANUAL FOR

AILTECH 71
NOISE GENERATOR POWER SUPPLY

REVISION B

AILTECH
A CUTLER-HAMMER COMPANY
FARMINGDALE, NEW YORK 11735
CONTROL

Use AILTECH supplied power cord(s) when operating AILTECH equipment.

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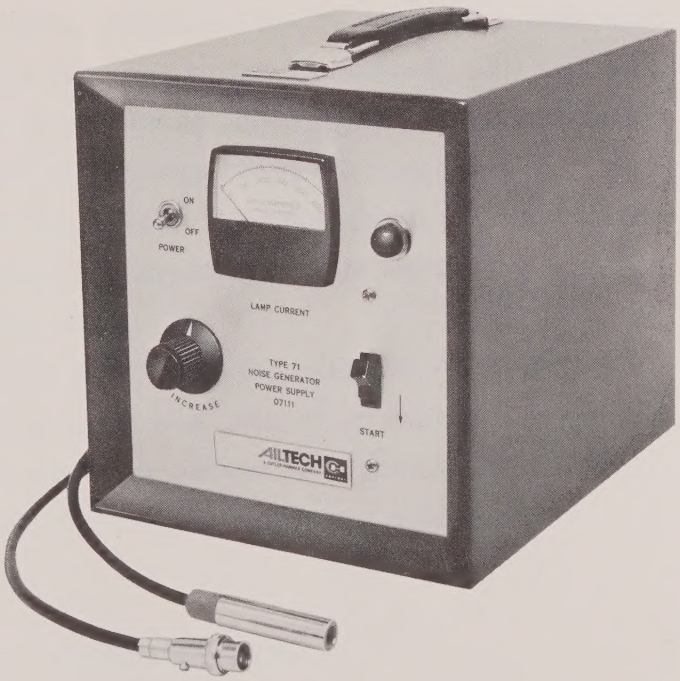
NOISE GENERATOR POWER SUPPLY



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CONTROL

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WARRANTY

Except for tubes, mixer crystals, fuses and batteries AILTECH products are warranted to be free from defects in material and workmanship and to perform within published specifications, under normal usage, for a period of one year from date of shipment. The limit of liability under this warranty is to repair, replace or adjust any product or part thereof (except for tubes, mixer crystals, fuses and batteries) which has been returned to an AILTECH factory within the specified warranty period by an original purchaser and is found to be defective or to have failed in normal service by our examination. All warranty returns must be first authorized by AILTECH or one of its authorized sales representatives, and all transportation charges prepaid.

AILTECH reserves the right to alter designs at any time on any of its products without incurring any obligation to install the same changes on units previously sold.

This warranty is to be considered the extent of AILTECH's obligation with respect to its products. No other warranty expressed or implied, exists nor is any other person or organization authorized to make or offer any other warranty or guarantee concerning AILTECH's instruments.

CERTIFICATION

The materials used in the fabrication of the above parts have been inspected and to the best of our knowledge and belief conform to specification requirements of the applicable purchase order.

Records of material analysis, inspections, calibration standards traceability to N. B. S. and other required tests are maintained in our files for future reference.

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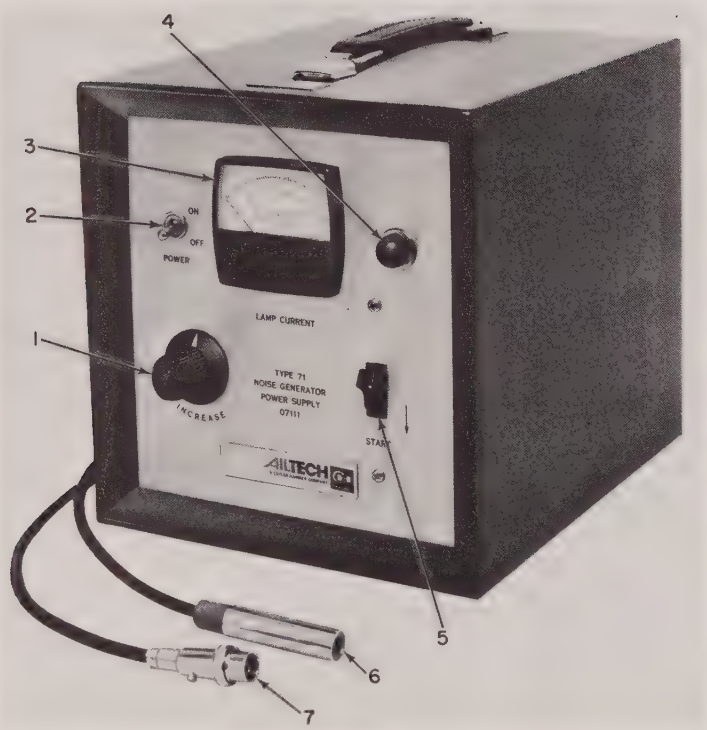
SECTION 1. INTRODUCTION

The AILTECH 71 Noise Generator Power Supply, Part Number 07111 (hereinafter referred to as the AILTECH 71), provides the high voltage necessary to fire argon and neon discharge tubes in noise generators (Figure 1). The output discharge current from these tubes can be adjusted to 250 mA with the INCREASE current control (1, Figure 2). Filament-type and cold cathode tubes can be operated from the AILTECH 71.

Two 6-foot cables are supplied to connect the AILTECH 71 to AILTECH 70 Noise Generators.

FIGURE 1. AILTECH 71 NOISE GENERATOR POWER SUPPLY



1. INCREASE current control
2. POWER ON OFF switch
3. LAMP CURRENT meter
4. Indicator lamp
5. START switch
6. Anode connector
7. Cathode connector

FIGURE 2. FRONT-PANEL CONTROLS AND INDICATORS

SECTION 2. SPECIFICATIONS

The specifications for the AILTECH 71 are:

Part Number	07111
Size	9-1/4 in. high x 8-3/4 in. wide x 10-1/2 in. deep
Weight	15 lbs
Input*	115 or 230 V AC, 50-60 Hz, 50 W
Output	Spike voltage: 2000 V (nominal) Discharge current variable to 250 mA
Duty	Continouus for all currents up to 250 mA
Filament current	200 mA maximum in START position

*The AILTECH 71 is factory wired for 115-V operation. To operate with 230 V slight modifications are necessary (Section 4).

SECTION 3. CONTROL FUNCTIONS

The functions of the controls and indicators are:

Nomenclature	Index No. (Figure 2)	Function
INCREASE current control	1	Varies discharge current of gas discharge tube
POWER ON OFF switch	2	Turns power on and off
LAMP CURRENT meter	3	Indicates discharge current
Indicator lamp	4	Indicates presence of input power
START switch	5	Controls firing of gas discharge tube

SECTION 4. OPERATING INSTRUCTIONS

To operate the AILTECH 71, proceed as follows:

1. Connect the cathode connector (7, Figure 2) to the cathode end of the noise generator being used. Insert the cathode connector in line with the axis of the noise generator. To prevent damage to the noise lamp, be sure that the tube pins line up with the connector. The nut retaining spring must seat flush against the connector mount, without excessive pressure, before the locknut is tightened.
2. Push the anode connector (6) into position at the anode end of the noise generator.
3. Connect the line cord to a primary power source.
4. To fire the lamp, place the POWER ON OFF switch (2) to ON; the indicator lamp (4) should light. Push the START switch (5) down and then release it. This generates a high-voltage pulse between the anode and the cathode of the tube and ionizes the gas.

CAUTION

A high-voltage pulse is generated when the START switch (5) is released. The connectors to the signal generator must be in place before the switch is operated. Check all connectors after each setup.

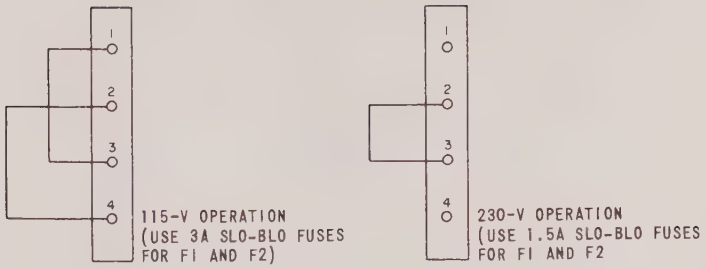
5. After the discharge tube fires, the LAMP CURRENT meter (3) will indicate the discharge current. Adjust the INCREASE current control (1) to the proper setting for the particular noise generator used. (This information is given in the instruction handbook for the noise generator.)
6. Turn off the discharge by placing the POWER ON OFF switch (2) to OFF.

The AILTECH 71 is factory wired for 115-V operation. To operate it with a 230-V input, the primary of T1 must be changed from parallel operation to series operation. To do this, rewire the input terminal strip (Figure 3) as follows:

1. Remove the black and red-black wire from the terminal with the red wire.
2. Remove the black-yellow and green-black wires from the terminal with the yellow wire.
3. Tie the black-yellow and red-black wires to the end terminal.
4. Connect the black wire to the terminal with the red wire.
5. Connect green-black wire to terminal with the yellow wire.
6. Replace F1 (1.5 A) with a 3/4-A slow blow fuse.

NOTE

This procedure is applicable to instruments with serial numbers under 900. For units with serial numbers 900 and above, remove the two jumpers from the input terminal strip and replace one jumper between terminals 2 and 3 as shown on page 4-3.



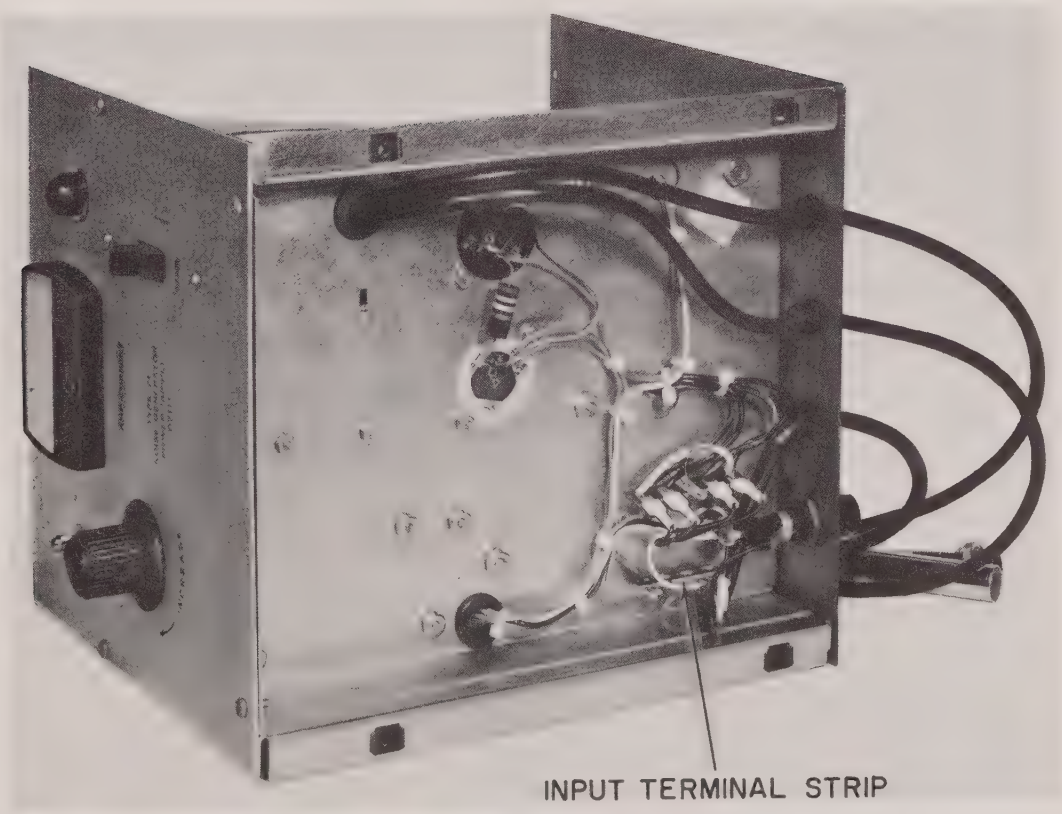


FIGURE 3. INPUT TERMINAL STRIP

SECTION 5. THEORY OF OPERATION

The AILTECH 71 generates a spike voltage to fire the gas discharge tube in the AILTECH 70 Noise Generators and supplies sufficient anode current to maintain the tube in operation. Refer to the schematic diagram (Figure 4).

Power is supplied to the input through double-pole single-throw POWER ON OFF switch (S2). The 120-V 3-W indicator lamp (I1) indicates the presence of input power. The 0.001-μf capacitors (C4A and C4B) are placed across the input to filter any RF components that might be present in the AC supply line. An isolation

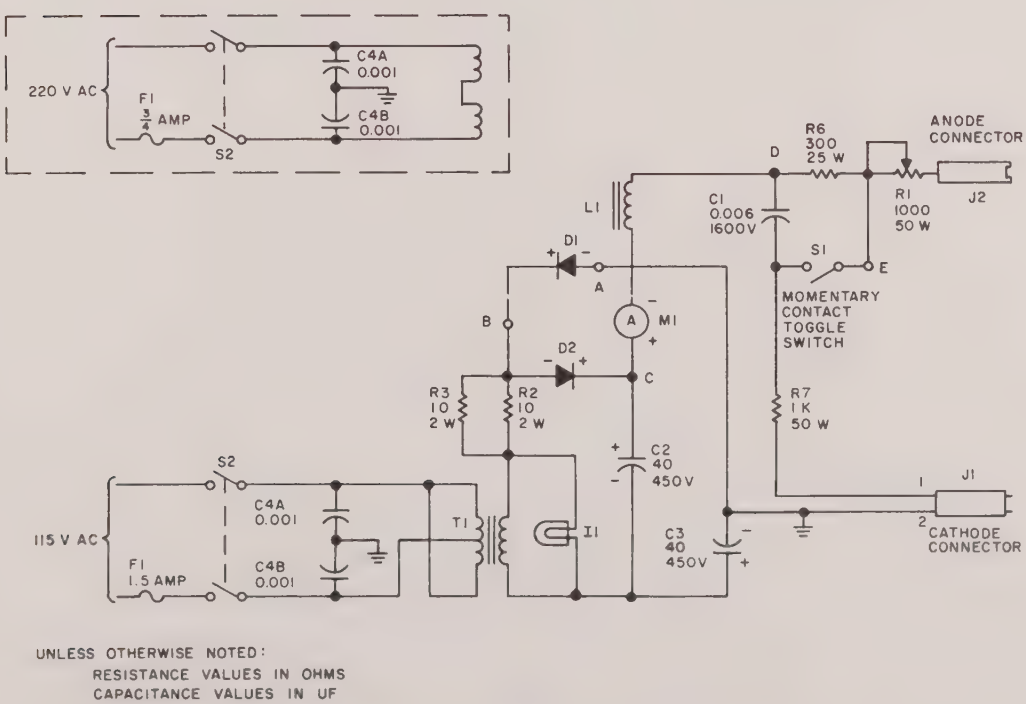


FIGURE 4. SCHEMATIC DIAGRAM OF AILTECH 71

transformer (T1) is used together with a conventional type of half-wave voltage-doubler circuit. Silicon rectifiers are used. LAMP CURRENT meter M1 (in series with a 4-henry choke and the anode) indicates gas discharge current in the gas tube. R1 (variable) and R7 (fixed) are also in series with the anode and act as current limiters. The 0.006-μf capacitor (C1) across the START switch minimizes arcing when the switch is operated.

With POWER ON OFF switch (S2) in the ON position, various DC voltages are generated. The input AC voltage to the AILTECH 71 is rectified by the silicon-rectifier circuit. The resulting DC voltage is filtered by two 40-μf electrolytic capacitors (C2 and C3). When spring-loaded START switch (S1) is released, a spike of about 2000 V is generated across the tube. The generation of spike voltage facilitates firing the gas discharge tube. The high spike voltage is a result of the sudden change in current in the choke when the START switch is released. The current through the choke (L1) then discharges through the limiting resistors and the anode; thus, the gas in the tube is ionized.

SECTION 6. MAINTENANCE

The preventive and corrective maintenance procedures outlined in this section should be followed to obtain maximum service from the equipment. The preventive maintenance procedure consists of performing voltage measurements at significant points in the circuit, measuring the start-voltage spike, and checking the lamp discharge current. A Tektronix Type 512 oscilloscope, or equivalent, must be used to measure the start-voltage spike. A noise generator must be used to check the discharge current. The maintenance procedure consists of troubleshooting the equipment and repairing and replacing defective components. A schematic diagram (Figure 4) and Replaceable Parts List (7) are provided for this purpose.

A. VOLTAGE MEASUREMENTS

NOTE

All measurements made with 115V AC input.

Use a DC voltmeter to measure the DC voltage from the points indicated on the schematic diagram to ground. The values obtained under no-load conditions should be as specified.

Point	Volts DC
A	0
B	160
C	320
D	320
E	320

B. START-SPIKE MEASUREMENT

To measure the start- spike voltage, proceed as follows:

1. Short circuit the two pins of the cathode connector.
2. Connect a high voltage oscilloscope probe such as the Tektronix P6013, to the anode connector.
3. Wrap a piece of hook-up wire around the high-voltage (anode) lead at least three turns. Connect one end of this wire to the trigger input jack of the oscilloscope to synchronize the oscilloscope to the spike. The other end of the wire is not terminated.
4. Adjust the oscilloscope for a sweep rate of 10,000 μsec/cm.
5. Connect the power plug to a 115-V AC source.
6. Set the POWER ON OFF switch (2, Figure 2) to ON.
7. Close the spring-loaded START switch (5) and release it. Measure the spike voltage amplitude on the oscilloscope as the START switch (5) is operated.
8. Multiply the oscilloscope reading by the probe attenuation (typically 1000) to obtain the spike voltage (2000 V nominal).

C. CHECK OF LAMP-START AND LAMP-DISCHARGE CURRENT

Set up the AILTECH 71 and a noise generator for normal operation. After the gas-discharge tube fires, turn the INCREASE current control (1) to the maximum clockwise position and observe the LAMP CURRENT meter (3). It should indicate more than 250 mA. With the lamp still fired, turn the INCREASE current control (1) to the maximum counterclockwise position. The meter should now indicate less than 150 mA. For high line voltage or special noise tubes, a series resistor of appropriate power ratings can be used to obtain lower output currents with no reduction in firing capability.

D. REPAIR

If it is necessary to return the equipment to the manufacturer for repairs, please write to the AILTECH Microwave Instruments Sales Department, Comac Road, Deer Park, New York. Give complete information concerning the nature of the failure and how the equipment was used when failure occurred. Also provide the type and serial numbers of the unit. After receipt of this information, special instructions will be supplied concerning the return of the equipment. All equipment should be packed and shipped in accordance with these instructions, with transportation charges prepaid. A failure report should accompany shipment of the equipment. Sufficient packaging material should be used to prevent in-transit damage.

SECTION 7. REPLACEABLE PARTS LIST

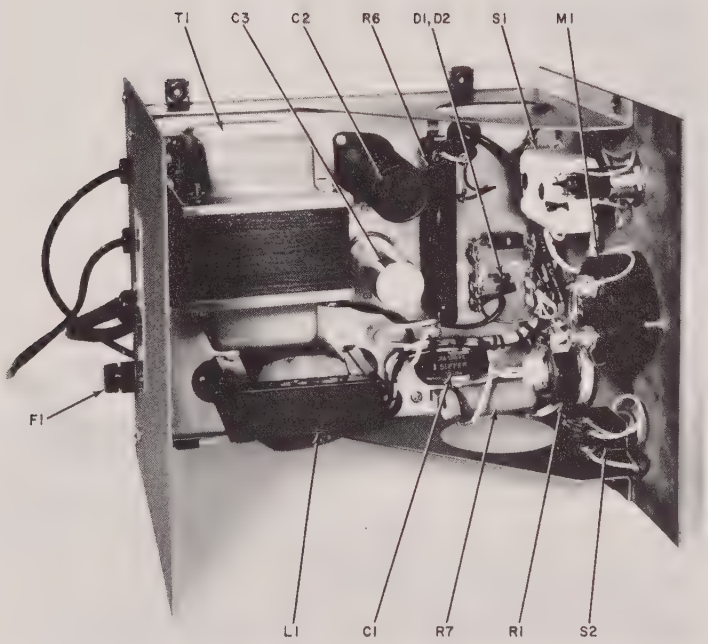


FIGURE 5. COMPONENT LAYOUT

Symbol (Figure 5)	Description	Suggested Manufacturer	Part Number
C1	Capacitor, paper, 0.006 μf, 1500 V DC	Sprague	MB-D6
C2,3	Capacitor, electrolytic, 40 μf 450 V DC	C-D	UPT4045T
C4	Capacitor, ceramic, 0.001 μf, 600 V	Centralab	DD2-102
D1,2	Rectifier, silicon	Texas Instruments	1N2071

Symbol (Figure 5)	Description	Suggested Manufacturer	Part Number
F1	Fuse, slow blow, 1.5 A	Bussman	MDL
I1	Lamp, indicator, neon	GE	NE-51
J1	Connector assembly, cathode	AILTECH	07003
J2	Connector assembly, anode	AILTECH	07003
L1	Choke, 4 H	Triad	C-15X
M1	Meter, mA	AILTECH	113202
R1	Resistor, variable, 1000 ohms, 50 W	Ohmite	0326
R2,3	Resistor, Fixed, 10 ohms, 2 W	Allen-Bradley	RC42GF100J
R7	Resistor, fixed, 1000 ohms, 50 W	Ohmite	0405
R6	Resistor, fixed, 300 ohms, 25 W	Ward-Leonard	23F300WL
S1	Switch, tumbler	AH & H	1629
S2	Switch, toggle	Cutler-Hammer	8363K7
T1	Transformer, power	Triad	N67A

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